1. **Describe the practice proposed for recognition, and list its objectives. Detail how the practice is innovative and how it promotes high student achievement.**

Pi is a transcendental number with the approximate value of 3.14159..... Given any circle the circumference/diameter = Pi.

Pi Day is a celebration of mathematics that is held on 3/14 and 3/15 every year in the media center. Two days are necessary in our school because of alternate day block scheduling. The Advanced Algebra 2 classes are divided into groups and assigned a geometry teacher to be their mentor. Each group creates a project, which applies the concept of Pi. They must submit a project proposal to their mentor and Algebra 2A teacher. Each group designs and builds a model that depicts the theme of their project. Examples of past projects are: Big Ben with flashing lights and questions on the rotation of the hands, an eight foot clown's face with facial parts consisting of circles and geometric probability of hitting particular parts of the face, a swimming pool with a desert island and pirates and the probability of throwing a coin onto to island, dolphins jumping through hoops, a Christmas tree with a train going around the bottom, a wedding cake with tiers and questions dealing with volume and area of the surfaces, Ghostbusters and the area that their ray guns were effective, parachutists jumping into a stadium and the probability of landing in the circles, to name only a few. Many of the projects are interactive. Each group must develop a set a questions, answer sheet and answer key relating to their project. A master packet is made of all the groups' questions that will be distributed to each geometry student when they enter "Pi Day" in the library.

A master schedule is made for all geometry classes to attend Pi Day during their geometry block. A packet is given to each geometry student and they are required to circulate to all the displays and solve the corresponding problems. Some of the projects have games and prizes associated with them such as a carnival game that uses geometric probability. Algebra 2A students are at their respective project to assist the geometry students with their problems. Communication using correct mathematical language is one of the criteria used for evaluation. When each geometry student has completed their circuit working at each station, they are given a certificate for a piece of "Pi."

The Food and Nutrition class bakes pies for the students and staff and provides recipes for their creations. The TV Production class tapes the event and edits it for the local cable TV. Teachers from every discipline visit to "sample" the projects and the "Pi." Each geometry class collates their answers and submits one packet to be evaluated. The winning class from each level is given a Pizza "Pi" Party in class. The teachers of the winning classes select the best time for their party.

Objectives for Algebra 2A students:

- Students will work as a team member in a group.
- Students will prepare coherent learning materials.
- Students will design and build an appealing visual display.
- Students will review, extend and spiral knowledge of applications of Pi to areas of geometry in real world situations.
- Students will communicate mathematically.
- Students will guide and teach geometry students.

Objectives for Geometry Students:

- Students will experience working in groups.
- Students will make interdisciplinary connections.
- Students will learn about application of Pi throughout geometry.
- Students will apply knowledge of geometric concepts learned to unique situations.
- Students will problem solve non-traditional problems.

"Pi Day" is innovative in that students from different levels, different math classes, and classes outside mathematics come together to celebrate and discover the properties of "Pi." Teachers and staff are given invitations to come and participate in the annual event. Most of the faculty and staff make a point to stop in during the two-day event. Some of the teachers take a packet and try to solve some of the problems. The Algebra 2A students are very proud to show their displays and describe their projects to their teachers of other disciplines and to members of the administration, thus promoting high student achievement.

The Algebra 2A students are given an opportunity to work with a mathematics teacher that they never had before and vice versa. This also insures the integrity of the projects. This offers a unique opportunity for both teacher and student. All geometry teachers are more than willing to participate as mentors and bring their classes to "Pi Day."

2. List the specific Core Curriculum Content Standards, including the Cross-Content Workplace Readiness Standards,* addressed by the practice and describe how the practice addresses those standards(s). Provide an example to substantiate your response.

Pi Day addresses numerous Core Curriculum Content Standards and Cross-Content Workplace Standards as follows: Standard 4.6 All Students will develop number sense and an ability to represent number is a variety of forms and use numbers in diverse situations. Through a consideration of the number π in a variety of contexts, students gain a greater appreciation for π as a real number. Students learn to distinguish between rational and irrational numbers using π as an irrational example. Students become familiar with the many areas of mathematics where π appears.

Standard 4.7 All students will develop spatial sense and an ability to use geometric properties and relationships to solve problems in mathematics and in everyday life. Obviously the number π lends itself to many areas of geometry and spatial reasoning. In the past, students have created projects, which apply areas such as geometric probabilities, three dimensional analysis, volumes, areas, and various other geometric models. These have included themes such as the solar system, swimming pools, Big Ben, parachute jumps, wedding cakes, football stadiums, and carnival games.

Standard 4.1 All students will develop the ability to pose and solve problems in mathematics, other disciplines and everyday experiences. In creating problem-centered projects, students gain experience in the problem-solving process. Participants enhance their problem-solving ability through their attempts to complete the project activities. The creative nature of each group's project adds to the motivation to complete the solution.

Standard 4.2 All students will communicate mathematically through written, oral, symbolic, and visual forms of expression. Pi Day fulfills this standard in spades. Students create visual and spatial projects and must also explain the symbolic mathematics behind each project. The students assist participants by orally explaining each activity. Participants communicate their answers in writing and interact with the creators of the activity during the problem-solving process.

Standard 4.3 All students will connect mathematics to other learning by understanding the interrelationships of mathematical ideas and the roles that mathematics and mathematical modeling play in other disciplines and in life. Through consideration of the role that the number π plays in many areas of mathematics and, through application in many areas of life, students gain a greater understanding of how mathematics connects to their own lives. For example, students have learned about the use of π with regard to planets in our solar system, use of geometric probabilities in carnival games, how π relates to the calculation of various other areas and volumes, etc.

Standard 4.4 All students will develop reasoning ability and will become self-reliant, independent, mathematical thinkers. Through the construction of their projects, students must describe clearly the mathematical reasoning behind each problem. Student participants must apply reasoning skills in solving each problem. The fact that this activity occurs out of the context of the mathematics class provides students with a new and motivating context for mathematical reasoning.

Cross-Content Workplace Readiness Standard #2. All students will use information, technology, and other tools. In constructing of projects, students use software such as The Geometer's Sketchpad. They also use computers, graphics calculators, projectors, and other hardware.

Cross-Content Workplace Readiness Standard #4. Students will demonstrate self-management skills. Through creation of projects, students are given the responsibility for managing their project completion using guidelines from the instructor. Participants must complete and hand in a packet of solutions for each problem. In doing so, they must manage their time accordingly.

3. Describe the educational needs of students that the practice addresses. Document the assessment measures used to determine the extent to which the objectives of the practice have been met. Provide assessments and data to show how the practice met these standards.

The mathematics department in our school is committed to address the needs of all students. The faculty in our school district has been trained in our staff development program to teach to different learning styles using appropriate strategies necessary to reach all students. Most traditionally successful math students are Sensing Thinkers or Intuitive Thinkers. "Pi Day" provides a perfect environment for students whose learning styles are Intuitive Feelers and Sensing Feelers. This type of student thrives on creative projects and working with and helping other people. Many of the students who create exceptional projects are not the same students who score highest on traditional mathematics tests. These students get a great sense of accomplishment when their projects are admired by the staff and administration.

The Algebra 2A students have an opportunity to develop their communication skills and review and extend their geometric knowledge. The geometry students process and extend their knowledge of geometry in various situations. All students involved in "Pi Day" work with students and teachers with whom they normally would not have contact. The ability to function, communicate and work with various types of people is a skill necessary for college and the workplace alike.

"Pi Day" is assessed on many levels. The Algebra 2A projects are graded and assessed with a rubric, which is given to the students before they begin their project. The Algebra 2A teacher gets input from the mentors and all math staff before scoring the rubric. The criteria include creativity, group effort, and quality of prepared questions.

Each Algebra 2A student must also complete a self-evaluation and is asked for input to make "Pi Day" even better next year. Some of the comments in the past include: "I liked teaching other students;" "I learned a lot about "Pi" that I never knew;" "It was fun;" "I liked the projects;" "It was different;" and "The pool and the pirates were great."

The current Calculus classes have requested that they make projects for the Pre-Calculus classes because of the use extensive use of Pi in that course. We are considering the feasibility of adding that dimension to our current "Pi Day" celebration.

There has been 100% participation by the Algebra 2A students since the inception of "Pi Day." The average grade for last year's projects was 95.5. Each geometry student in attendance is required to complete a packet during their visit to "Pi Day". Their geometry teacher polls students and the class decides on the final answers for their class packet. The class packets are graded and the winning classes from each level are announced on the PA. The classes of all levels work hard to get the "Pizza Pi" party. The Food and Nutrition classes and TV Production classes are graded according to their teachers' criteria.

Recently an Algebra 2A teacher knew that "Pi Day" had a positive impact on her students when she was talking to a teacher she happened to meet in Florida. The teacher mentioned a great idea in a school in New Jersey that her nephew attended. That idea was "Pi Day" and the school was her own school!

4. Describe how you would replicate the practice in another school and/or district.

Pi Day can be easily replicated in any secondary school as follows:

- Enlist the help of Algebra 2A and geometry teachers
- Disseminate project requirements to Algebra 2A students
- Organize logistics for presentations
- Develop visitation schedule for geometry classes
- Prepare student packets
- Collect and grade class submissions
- Arrange for party for winning team

Pi Day can be implemented at any level of involvement from a single class to an entire school. It's as easy as Pi.